

ЦИФРОВАЯ ЭКОНОМИКА: УПРАВЛЕНИЕ НА ТРАНСПОРТЕ И ИНТЕЛЛЕКТУАЛЬНЫЕ ТРАНСПОРТНЫЕ СИСТЕМЫ

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АННОТАЦИЯ

В последние годы Российская Федерация встала на путь развития цифровой экономики. Данный термин был введен в научный оборот в 1995 г. американским информатиком Н. Негропonte. Агрегированную оценку понятия дает академик Клейнер, определяя цифровую экономику как состояние среды, в котором технологии (цифровые) выступают результатом, представленным в качестве образов, объектов виртуальной реальности, данных, знаний, моделей. Ключевым параметром цифровой экономики выступает прогноз будущего состояния среды. Необходимым условием перехода к цифровой экономике является качественное изменение среды, которая должна соответствовать цифровому характеру экономики. При этом важным вопросом остается цифровизация в конкретных отраслях экономики, в частности, в сфере транспорта и логистики. Очевидно, что цифровой транспорт и логистика потребуют иного подхода к управлению, который не только учитывает технологические аспекты, но и ориентирован на клиента в большей степени, чем когда-либо прежде. Это формирует предпосылки для создания цифрового сервиса XXI в., клиентоориентированной экономики по требованию в условиях цифровой реальности. Целью исследования является определение основных концепций цифрового транспорта и логистики в России, выявление основных трендов цифровизации, характерных для настоящего времени, а также анализ интеллектуальных транспортных систем.

КЛЮЧЕВЫЕ СЛОВА

Интеллектуальные транспортные системы, цифровой транспорт, нейросети, сервисная экономика, экономика совместного пользования, цифровая логистика.



DIGITAL ECONOMY: TRANSPORT MANAGEMENT AND INTELLIGENT TRANSPORTATION SYSTEMS

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ABSTRACT

In recent years Russian Federation is on the way to the digital economy development. This term was introduced in 1995 by the American computer scientist N. Negroponte. However, until now, the opinions of scientists disagree about the exact interpretation of this concept. Aggregated term was suggested later by Academician Kleiner, who defined the digital economy as a state of the environment where information technologies are the result which includes objects of virtual reality, data, knowledge, models. The key parameter of the digital economy is the forecast of the future state of economical environment. A necessary condition for the transition to a digital economy is a qualitative change in the environment, which must correspond to the digital nature of the economy. At the same time, digitalization remains an important issue in specific sectors of the economy, in particular in the field of transport and logistics. Obviously, digital transport and logistics will require a different management approach, which not only takes into account technological aspects, but also focuses on the customer more than ever before. This forms the prerequisites for creating a digital service of the 21st century, a customer-oriented economy on demand in the digital reality. This study's purpose is to examine main conceptuals of digital transport and logistics in Russia, identify the advanced trends of transport digitalization typical for the present time, analysis of intelligent transport systems. This article emphasizes exceptional role of the intelligent transportation systems in the matter of providing high level of freight forwarding services, what applies equally to both passenger and freight traffic.

KEYWORDS

Intelligent transportation systems, digital transport, neurosets, service economy, economy of sharing, digital logistics.

CITATION

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The development of humanity matches an ascending spiral. These changes intensity directs the revolutionary development of scientific, technical, intellectual, economic and information spheres. It is natural that every next step of economic era is driven by high technology aspects. Thus, the combustion engine has become revolutionary in production and human life as a whole. In the 20th century, Internet as a worldwide web is considered to be the powerful move in development of information technologies. According to Jay Gould (famous paleontologist) calls the changes an intermittent equilibrium. At the same time the progress is following the way of dualism, along with technical innovations there are both changes in people's consciousness and psychology which structures a social request. The Nobel Prize Winner Friedrich Hayek used to write: "Decentralization is a way to the functioning economy and society. Decentralized economy complements the dispersed nature of information disposed in society" [Khayyek, 2011, p. 15].

In the new 21st century the progress, in our opinion, should be driven by digitization of real economy sectors which, by the middle of the century, might lead to something matching characteristics of artificial intelligence.

The facts from the history of economics and society given above as well as a desire to face philosophical issues in transport economy make the research given below relevant. This study's purpose is to understand the phenomenon of the digital transport and logistics as an integral part of digital economy of the Russian Federation.

The tasks are:

- determine the effectiveness of the transport complex in the digital economy;
- explore the quality of digital services;
- diagnose the supply and demand factors in digital transport and logistics;
- examine the infocommunication environment while building the intelligent transport systems (ITS);
- examine international experience of digitization of transport comparing the digital projects in Russia and abroad;
- examine the legal and regulatory framework in digitization of Transportation Complex of the Russian Federation;
- analyze the development of digital transport and logistics in Russia using the "benefits and threats" model.

The scientific novelty consists of:

- better understanding of transportation services with regard to digitization of the economy;
- quality cycle detection of digital transport and logistics;
- basic principles to explore separate components and the structure of digital transport system and logistics in Russia;
- diagnosis of transport digitization problems based on digital projects in Russia and outside;
- algorithm of digital transport and logistics network;
- the term of "transportation model of optional use", the features of digital transport and logistics as a transportation model of optional use;
- role of infocommunication environment while building the ITS [Stepanov et al, 2014];
- building a graphical diagram of users with the service provider in digital economy;
- survey questionnaire that takes into account the opinion of modern users of transport (Z-generation) in a quality transport service;
- recommendations for development of digital transport and logistics.

According to the academician Grinberg [2018, p. 43], "one of the main element containing the potential to develop Russian economy is a need to connect the country's territory to a single space". In fact, there's a tendency to compress space on one hand, and make prerequisites to create a single information and communication space – on the other (correlated with "annihilation of space and time" according to K. Marks [2001, p. 257]). In this regard, the role of transport grows greater than ever.

It should be noted that to confront this ambitious plan the transport complex should be considerably transformed, it should acquire a shape of innovative network literally covering the whole territory. At the

same time the development should be focused not on quantitative but qualitative measures. Avoiding traditional methods (construction and reconstruction of roads as a single way) will allow to tear up the vicious circle of the transport demand and supply. At the same time a new infrastructure generates a new transport demand requiring the unlimited budget on construction and reconstruction.

With this regard, the 21st century transport should be based upon the philosophy of automation, intellectualization, improving quality of transportation, eliminating losses and reducing costs [Persianov et al, 2017]. Such quality cycles of digital economy depend on customers' preferences automatically located by the system. At the same time the economic growth should be expedited not only through digitalization but by knowledge increase, work experience and training essential for digital technologies.

A number of organizational, legal and social conditions will be required for platformization of the digital transport and logistics.

In accordance with the foreign experience in digital transport and logistics the process of making such a transport structure is narrowed by establishing the national development centers [Arbeitsplatzversorgung mit flexiblen Shuttle, 2016]. The concept is based upon the available expertise, experience, technologies and competences coming from close interaction between the government, the private sector and citizens. In particular, the state is highly responsible for interactions among economic entities and establishing the "digital trust". The public opinion is also important because a number of operations become automatic which results to exceeding labor productivity and the unemployment even for the highly qualified staff. In this regard there is an urgent need to educate a new level managers and engineers.

The digital economy will run the risk of:

- marginalism;
- hanging the state's role, the need to ensure the "digital sovereignty" of the country;
- enhancing the global "digital" competition in various economic spheres;
- the need to provide cybersecurity (personal data protection, cyberterrorism, money transfers reliability, etc.);
- the need to review legislation;
- employment (unemployment, "black employment").

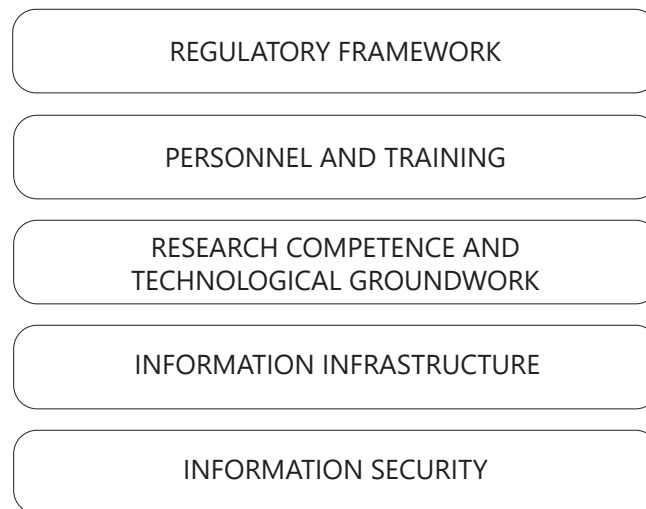
According to the European Union's (EU) data, the automation (autopilot) allows to reduce motor transport demand by 80-90% as well as to decrease operating costs for carriers by 30% through the non-stop traffic.

Such initiative should be expanded through crossing the areas of interest (Fig. 1) Let's notice the project of "digital transport and logistics" has started in Russia. The digital platform of transport complex of the Russian Federation is an integral part of the "Digital Economy" Project.

The Russian companies' consortium of Platon (toll system), Russian Railways and GLONASS will start cooperating on the development of digital transport in 2019. The program of "Digital Economy of the Russian Federation" is governed by the Resolution of the Government of the Russian Federation of July 28, 2017 No 1632 [Resolution, 2017] which establishes the work order for transport regulation, information and analytical system as a transport monitoring system supporting the government transport planning decisions. The basic directions for the digital economy development are presented in Fig. 1. To meet the interests of any group of users is one of the important factors of digital transport and logistics development.

The concept of digital transport and logistics based on the national multi-level transport macro-planning model on a single information field with the end-to-end control and unified policy should be finalized and legislatively approved (Fig. 1).

From the practical standpoint the large domestic companies step on a cooperation field in order to meet innovation challenges of transport issues. As a successful example of transport digitalization, the Caravan project provides arrangements for the national corporate ITS which involves the deployment of integrated digital road infrastructure and the main system components [Persianov et al, 2017]. The ITS complex deployed on the route includes: the high-precision transport positioning system, the streamchange intensity measuring system, the incident detecting and recording system. The project provides a number of additional beneficial services such as a digital road model for better cybersecurity and data transfer protection system, a modular platform for ITS and traffic participants interaction. The supporting systems include LTE cellular communication systems and engineering utilities.



Source: made by authors as a result of research

Fig. 1. Basic principles for the development of digital transport and logistics system in Russia

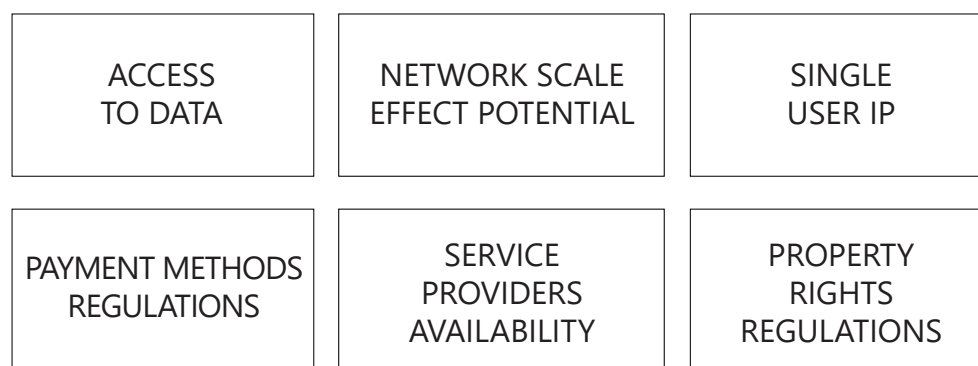
Let us note that the development of the national transport and logistics system is a destiny of all economically advanced countries. Successful intellectualization projects have been implemented in a number of European countries. In particular, as an example of a global model there might be the common information and transport model of Europe (Trimode) which provides: EU transport coverage, passengers and cargo monitoring, transport streams scanning, energy consumption monitoring, accounting for economic factors on transport. The system tasks include planning, monitoring and goal-setting functions [Zhankaziyev et al, 2017; Auch die intralogistik wird digital, 2016]. Such transport models are mathematical algorithms of socio-economic and transport data in a specialized development environment. The transport infrastructure digital database, which is a Transmodel Standard, is being actively developed (the Czech and British analogues available).

According to the analysis of transport systems in cities of Russia including Moscow, Kazan and Sochi, the effective management option could be the common information system for the transport complex, management tools for decision-making process as well as the transfer from transport streams modeling to a process of assessing the impact of transport and the economy (including environmental control issues). At the same time the data processing should be based on a data fusion principle which is processing and merging data from different institutions for better accuracy.

It is obvious at present that the transport complex of Russia is characterized by partial platformization. Today there's no genuine "digital" transport and logistics. In order to meet more complicated challenges it is necessary to form a single data environment (information and communication space). Taking into account modern technologies, it is advisable to expand a similar environment based on a Blockchain Technology.

At the same time the system of "digital" transport and logistics should be of a multi-level character [Bubnova, 2017]. There should be an area topography as a basis with multiplicity of platforms above (of regional, national, local and international level) functioning as a single transport and communication space-form providing sustainable development of transport and human interaction. Meetings and human interactions is a possibility to pile up the communication potential. At the same time the distribution of energy potential shall resemble the form of a distribution network featuring speed, flexibility and adaptability to the shifting environmental conditions. Note that the value of such networks is settled on its periphery. The State's task is to build such a network of "digital" transport and logistics where the primary role within the process of decentralization will be played by users. It is them who generate additional value.

This network model assumes availability of many services concentrated on aggregator platforms such as Uber, Trans.edu, etc. The service quality is responsibility of operator who provides (Fig. 2).



Source: made by authors as a result of research

Fig. 2. The service quality classification

The additional benefit from the network lies on a principle of “preferred attachment” which is the more digital connections, the bigger and wider the potential of the system as a whole. In this case, the network connection process must operate in instantaneous availability.

According to the analysis the development of information technologies is a tendency of the world leading economies. Thus, as early as in 2017 the Russian Government made allocations of a billion roubles for the digital economy development. In the 2017–2020 time period the state budget expenditures shall amount up to 30 billion roubles. Especially active elements of digital economy are available in large cities with dominating transport industry based on the development of intelligent transport systems. It allows you to provide a high level of citizens mobility, to make an individual route according to the passengers’ requirements. Urban passenger transport in the digital economy is built on digital platforms concentrated on different transports available in the city. Such opportunities establish new principles of modern transport management where it is necessary to operate the huge amounts of data online.

As noted above, the development of “digital” transport and logistics is vital for increasing economic activities not only in Federal centers but in small cities located on intersections of various platforms. This will take a positive effect on the whole country.

The “digital” transport and logistics will provide the higher circulation speed of the economy, the higher level of clients’ service, the better life quality of citizens, the lower transport component in the structure of goods and services produced in the country. As it was noted above, this will require newer social and technological factors, legislative amendments and organizational changes.

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